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5 The present invention provides apparatus, methods, and computer program products for non-iterative division and non-iterative reciprocal generation. In one embodiment, the present invention uses a logic network that determines the bits of the quotient of a divisor and dividend by using a non-iterative, (i.e., non trial and error), method. Further, in another embodiment, the present invention may determine the reciprocal of a number M by separating the number M into at least two numbers X, Y...Z so that $M = X + Y + \dots + Z$. The reciprocal of M is computed according to an equation $1/M = F(X, Y \dots Z)$ or an approximation $1/M \approx G(X, Y \dots Z)$, where the approximation gives the correct value of the inverse of M to a predetermined accuracy. In some embodiments, the apparatus uses an equation that exactly describes the reciprocal or instead, it may include one or more memories for storing look-up tables containing pre-calculated parts of the equation.